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AUTHOR Fisher, Maurice D.
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ABSTRACT

This inquiry demonstrated how the educational assumptions underlying the Montessori Method can be applied to constructing educational objectives and evaluating programs for culturally disadvantaged children. Initially, it was shown how these assumptions concentrate upon significant areas of human development. Then, information about perceptual-motor deficiencies was combined with the educational assumptions to construct educational objectives which can be used to design and evaluate perceptual-motor training programs. It was concluded that the developed educational assumptions and objectives are associated with a motivational model that promotes optimal cognitive and social development. (Author/JM)

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EDUCATIONAL ASSUMPTIONS FOR CONSTRUCTING OBJECTIVES AND EVALUATING PROGRAMS FOR CULTURALLY DISADVANTAGED CHILDREN

by

Maurice D. Fisher

University of Virginia

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This inquiry demonstrated how the educational assumptions underlying the Montessori Method can be applied to constructing educational objectives and evaluating programs for culturally disadvantaged children. Initially, it was shown how these assumptions concentrate upon significant areas of human development. Then, information about perceptual-motor deficiencies was combined with the educational assumptions to construct educational objectives which can be used to design and evaluate perceptual-motor training programs. It was concluded that the developed educational assumptions and objectives are associated with a motivational model that promotes optimal cognitive and social development.

TABLE OF CONTENTS

	Page
OVERVIEW	1
METHOD FOR CONSTRUCTING THE EDUCATIONAL ASSUMPTIONS	6
Derivation of Educational Assumptions	6
Educational Assumptions	8
EXAMINATION OF DEFICIENCIES IN THE DISADVANTAGED CHILD	23
Perceptual and Motor Deficiencies	24
DERIVATION OF EDUCATIONAL OBJECTIVES	28
Educational Objectives	31
CONCLUSION	35
REFERENCES	37

OVERVIEW

This inquiry is concerned with demonstrating how the educational assumptions which underlie the Montessori Method can be applied to constructing educational objectives and evaluating programs for culturally disadvantaged children. Initially, it is shown how these assumptions refer to the following areas of development and learning: (1) the acquisition of sensory and motor abilities which serve as a basis for independent learning activities; (2) the development of independent problem solving activities through the "directing" role of the teacher; (3) the construction of didactic materials that enable children to gain immediate feedback concerning the correctness of their problem solving behavior; (4) the use of intrinsic reinforcements which are generated from problem solving activities; (5) the design of a learning environment which encourages the development of esthetic values; and (6) encouraging social and intellectual development by placing children of different ages together in the same classroom.

After a discussion of how Montessori applied these assumptions to educating young children, it is shown how they (assumptions) are congruent with J. McV. Hunt's motivational model, since they refer to methods by which children can be motivated to learn increasingly complex problems. For example, these educational assumptions

can be effectively used to solve Hunt's "problem of the match" since they stipulate a learning environment that constantly motivates the child to higher levels of performance. This situation occurs because the educational stimuli in this environment can always contain a greater amount of information than has been previously assimilated by the child. Thus, the child is forced to accommodate his cognitive structure to these stimuli. However, it was stated that the fundamental problem (in designing an educational system that utilizes Hunt's motivational model) concerns the measurement of optimal incongruence between external stimuli and expectations. The assumptions developed in this paper appear to offer a solution to the problem of the match because they stimulate the development of independent learning activities which allow the child to determine how much incongruence he can tolerate in a particular learning task. A child who cannot tolerate a large discrepancy will proceed to learn by gaining small amounts of information while a more capable pupil will accommodate to larger "chunks" of information.

Specific illustrations are also given of the motivational processes underlying each of these assumptions, and further examples demonstrate how they are congruent with the educational ideas of Kohlberg, Moore, Bruner and Bloom. For instance, sensory and motor training (Assumption One) allow the pupil to create the

proper "match" between external stimuli and information presently available in cognitive structure, and the teacher's role should be to direct children in discovering a level of incongruence which they can tolerate (Assumption Two). However, success in maintaining a high level of motivation depends upon the types of didactic materials used by the pupil. If these materials provide immediate feedback, and are congruent with his level of mental development (Assumption Three), then mastery of the task is assured, because immediate feedback provides the child with information concerning whether he has successfully accommodated his cognitive processes to the problem. But didactic materials must be designed that both exercise current mental processes and move the child to higher levels of development. In order to accomplish these goals, materials should be designed which are both similar to previous materials and contain differences that encourage the growth of mental abilities. In this situation, the child receives reinforcements from his problem solving activities rather than from external sources (Assumption Four), and a correct "match" can occur because the child informs himself, concerning the success of his attempt to overcome incongruence between his expectations and external stimulation. Thus, the child develops control over his behaviors through observing their outcomes instead of depending upon external sources of information.

In order to demonstrate how the assumptions can be applied to constructing educational objectives, the perceptual-motor deficiencies of culturally disadvantaged children are described in detail, and this description is based upon the study of the research literature which is concerned with the learning and developmental deficits of culturally disadvantaged children; and information about perceptual-motor deficiencies is combined with the educational assumptions derived from the Montessori Method in order to construct a set of educational objectives. These educational objectives refer to: (1) the development of independent perceptual-motor learning activities; (2) the use of didactic materials that are immediately reinforcing and intrinsically motivating; (3) the use of tasks which educate the culturally disadvantaged child's ability to pay attention to auditory and visual stimuli, shift attention between auditory and visual modalities and discriminate between both auditory and visual stimuli; (4) the utilization of learning problems which give training in organizing stimuli; (5) the use of artistic works to train perceptual discrimination and organization; (6) the development of eye-hand coordination through the presentation of appropriate learning tasks; and (7) the development of perceptual-motor aptitudes by allowing children to interact with each other.

The concluding discussion of the process for constructing educational objectives describes some didactic materials and learning activities which can be utilized to attain the outcomes of the developed educational objectives.

It was concluded that the developed educational assumptions and objectives are associated with a motivational model that promotes optimal cognitive and social development, and educational assumptions based upon this model should describe the general principles for motivating children to learn materials and develop their maximum cognitive and social abilities. It appears that the application of this model can also provide an effective evaluation technique because it requires that the evaluator ask three important questions:

1. Is the program derived from examining the child's cognitive and social deficits?
2. Is the program motivating the child to learn progressively more complex materials?
3. Is the child's cognitive and social development being promoted?

Thus, the refinement of the developed motivational assumptions and the further analysis of cognitive and social deficiencies will provide a source for generating more precise educational objectives and evaluating programs for culturally disadvantaged children.

METHOD FOR CONSTRUCTING THE EDUCATIONAL ASSUMPTIONS

Derivation of Educational Assumptions

Educational assumptions which are derived from the Montessori method are utilized to construct educational objectives for the disadvantaged child, and these assumptions will be described in this section. The assumptions are congruent with J. McV. Hunt's motivational model (1961, 1964) since they refer to methods by which children can be motivated to learn increasingly complex problems. According to Hunt, the human organism acquires internal standards of the most satisfying level of environmental stimulation. When incongruence exists between these standards and external stimulation, the organism behaves in a manner to reduce this incongruence. Hunt believes that educational methods must develop an optimal level of incongruence in order to encourage effective learning, and he states that the Montessori method appears to solve this problem. Hunt's discussion of how the Montessori approach solves the problem concerning the optimal "match" between expectations and environmental stimulation clearly demonstrates his viewpoint:

> It was this "problem of the match" that prompted my interest in Montessori's work. When I wrote Intelligence and Experience, this problem of the match loomed as a large obstacle in the way of maximizing intellectual potential.

> I deserve no credit for discovery, however, because as recently as two year ago, the name of Montessori would have meant to me only one of those educational "faddists" who came along shortly after the turn of the century. It was after a day-long discussion of such matters with Lee Cronbach and Jan Smedslund at Boulder in the summer of 1962, that Jan Smedslund asked me if I knew of Montessori and her work. When I claimed no such knowledge, he advised me to look her up, because, and I quote his words as I remember them, "she has a solution to your problem of the match--not a theoretical solution, but a practical one." I believe Smedslund is correct, for in arranging a variety of materials in graded fashion, in putting together children ranging in age from three to seven, and in breaking the lock-step in infant education, Montessori went a long way toward a practical solution. Grading the materials permits the child to grow as his interests lead him from one level of complexity to another. Having children aged from three to seven years together should permit the younger children a graded series of models for imitation and the older ones an opportunity to learn by teaching. Breaking the lock-step provides that opportunity for the child to make his own selection of materials and models. In the present state of our knowledge about the match, I believe only the child can make an appropriate selection. Thus, I believe there is an important psychological basis for Montessori's practice. (Montessori, 1964; introduction by Hunt, pp. xxviii-xxix.)

The following assumptions have been derived from an examination of The Montessori Method (Montessori, 1964), Spontaneous Activity in Education (Montessori, 1965), and The Absorbent Mind (Montessori, 1967). Their relevance to Hunt's intrinsic feedback model of motivation is discussed after they have been related to Montessori's educational ideas.

Educational Assumptions

1. The child's sensory and motor abilities must be educated to prepare him for independent problem solving activities.

Montessori initially presented children with didactic materials that sharpened their abilities to discriminate between geometric forms and colors because she believed this type of training provided a basis for intellectual development. Thus, the pupil develops facility at attending to stimuli and making judgments about differences and similarities. The following statement by Montessori demonstrates her belief that these sensory exercises promote intellectual development:

> It is exactly in the repetition of the exercises that the education of the senses consists; their aim is not that the child shall "know" colours, forms and the different qualities of objects, but that he refine his senses through an exercise of attention, of comparison, of judgment. These exercises are true intellectual gymnastics. Such gymnastics, reasonably directed by means of various devices, aid in the formation of the intellect, just as physical exercises fortify the general health and quicken the growth of the body. The child who trains his various senses separately, by means of external stimuli, concentrates his attention and develops, piece by piece, his mental activities, just as with separately prepared movements he trains his muscular activities. These mental gymnastics are not merely psycho-sensory, but they prepare the way for spontaneous association of ideas, for ratiocination developing out of definite knowledge, for a harmoniously balanced intellect . . . .
> (Montessori, 1964, pp. 360-361)

Montessori also thought that motor training served as a basis for intellectual development. The pupil receives this training while

solving the didactic problems, since he learns to coordinate his motor movements with sensory stimuli. She recommended that motor movements be analyzed into their component parts so that each of these parts can be developed through the use of didactic materials.

2. The teacher's primary role is to "direct" the child's independent problem solving activities.

This assumption underlies all of the classroom activities developed by Montessori, and it changes the teacher's educational function from an expository instructional role to a designer of environments which promote independent learning. In this role, the teacher "has thus become a 'director' of the spontaneous work of the children . . . ." (Montessori, 1964, p. 370). This directing function requires that the teacher must not interpose her personality between the child and the learning task. Instead, she must present materials in a manner which requires him to concentrate upon the learning task. Montessori believed that the teacher can achieve this goal by selecting didactic materials which the child finds interesting. Initially, he is introduced to a learning problem and its solution by the teacher. Then, the pupil engages in independent learning activities on subsequent encounters with the problem.

3. Didactic materials should be utilized which enable the child to gain immediate feedback concerning the correctness of his problem

solving behavior and that are congruent with his level of mental development.

According to Montessori, materials which are "self-correcting" promote successful independent learning by allowing the child to observe the immediate effect of his actions, and they motivate him to engage in more complex problem solving behaviors. Self-correcting materials provide the child with immediate information concerning the results of his responses. Hence, if he makes an error, he will correct himself on the next trial instead of repeating the mistake. Montessori's description of a simple problem solving activity clearly indicates her belief that didactic materials must be self-correcting:

> The didactic material controls every error. The child proceeds to correct himself, doing this in various ways. Most often he feels the cylinders or shakes them, in order to recognize which are the largest. Sometimes, he sees at a glance where his error lies, pulls the cylinders from the places where they should not be, and puts those left out where they belong, then replaces all the others. The normal child always repeats the exercise with growing interest. (Montessori, 1964, p. 171)

Montessori attempted to present materials in a sequence that was congruent with cognitive development. Although she did not specify the effect of sequencing materials upon error rates, it appears that this technique reduces errors and provides an extensive amount of positive feedback. The rewarding value of the didactic materials motivates the child to repeat exercises until he becomes bored with

them, and when this level of satiation is reached, he is presented with more complex materials.

4. Learning is most effective when it is followed by intrinsic reinforcements which are generated from problem solving activities.

Montessori did not utilize external rewards and punishments in order to motivate children because she believed that the most effective reinforcements emerge from observing the results of problem solving activities. Her discussion concerning problem solving training clearly illustrates her position on this problem:

> To obtain such discipline it is quite useless to count on reprimands or spoken exhortations. Such means might perhaps at the beginning have an appearance of efficacy: but very soon, the instant that real discipline appears, all of this falls miserably to the earth, an illusion confronted with reality--"night gives way to day." (Montessori, 1964, pp. 349-350)

If didactic materials are designed according to the criteria described under assumption number three, then it is likely that the child will receive extensive intrinsic reinforcements while performing tasks. Montessori believed that these reinforcements motivate him to attend completely to learning tasks, while external reinforcements are distracting stimuli. Thus, the "prize and the punishment are incentives toward unnatural or forced effort, and, therefore we certainly cannot speak of the natural development of the child in connection with them . . . ." (Montessori, 1964, p. 21)

5. <u>The learning environment should contain stimuli which encourage the development of esthetic values.</u>

The didactic materials used in Montessori schools are attractively designed in terms of such qualities as form and chromatic balance, since Montessori believed that children should be exposed to esthetically pleasing stimuli. It appears that her critical statement about the drab classroom environments of fifty years ago also validly describes some contemporary situations:

> the schools seem veritable tombs, with their desks arranged in rows like black catafalques . . . . Class-rooms have black desks, and bare, gray walls, more devoid of ornament than those of a mortuary chamber; this is to the end that the starved and famishing spirit of the child may "accept" the indigestible intellectual food which the teacher bestows upon it . . . . On the other hand, the spiritual school puts no limits to the beauty of its environment, save economical limits. No ornament can distract a child really absorbed in his task; on the contrary, beauty both promotes concentration of thought and offers refreshment to the tired spirit . . . . (Montessori, 1965, p. 146)

Apparently, an esthetically pleasing environment can also provide sensory training by causing children to discriminate among various stimuli. This type of a setting can be designed by artists or teachers who have been instructed in the problems of arranging such environments.

6. Placing children of different ages together promotes their social and intellectual development.

Montessori stated that a child of three years can learn readily from a five year old because he emulates his older classmate and wants to master the same tasks. The older child also benefits from his younger classmates, since he learns to explain problems and to aid other children. It appears that this situation breaks down the young child's egocentric attitudes by forcing him to engage in role playing activities. Thus, the five year old must infer some of the learning problems of a three year old before he can explain a task effectively.

It appears that these educational assumptions can be effectively used to solve Hunt's "problem of the match," since they stipulate a learning environment that constantly motivates the child to higher levels of performance. This situation occurs because the educational stimuli in this environment can always contain a greater amount of information than has been previously assimilated by the child. Thus, the child is forced to accommodate his cognitive structure to these stimuli. However, the fundamental problem in designing an educational system that utilizes Hunt's motivational model concerns the measurement of optimal incongruence between external stimuli and expectations. Clearly, the Montessori method allows the child to solve this problem through his independent learning activities because the child determines

how much incongruence he can tolerate in a particular learning task through his manipulations of didactic materials. A child who cannot tolerate a large discrepancy will proceed to learn by gaining small amounts of information while a more capable pupil will accommodate to larger "chunks" of information. In reference to this problem Hunt says:

> The pertinent information about the matching process appears to be of two kinds. One kind concerns the nature of the organism's or child's existing central processes, i.e., his existing sensorimotor schemata, or his knowledge. This kind of information must come either from clues gleaned from observing samples of his behavior in circumstances like those to be matched to his existing schemata, from hearing him talk about relevant matters, or from knowledge of the given organism's or child's past experience. The second kind concerns the size of the steps in discrepancy between circumstances and central process, i.e., between circumstance and level of developed capacity, or between circumstance to be accommodated and those circumstances which have already been assimilated, which the individual organism or child can accommodate. The size of the steps which can be accommodated would appear to be a kind of measure of potential for intellectual development. Such information comes from observing the readiness of an individual to "catch onto" innovations, i.e., to accommodate new circumstances . . . . (Hunt, 1964, p. 273)

The specific relationship between Hunt's model and the educational assumptions generated from the Montessori method can be determined from an examination of the motivational processes underlying each of these assumptions. Initially, the child is prepared for intellectual activities by giving him sensory and motor training (Assumption One). This training proceeds from lessons in which stimuli are presented

in contrasting pairs to situations which require finer differentiations among stimuli. The pupil creates the proper match by selecting sensory problems at a particular level of complexity; and the stage is being set for discovering the correct match on conceptual tasks, since the child is trained to discriminate and classify stimuli. More complex motor activities are also engaged in when the child moves to higher levels of attainment. The teacher's role is to direct children in discovering a level of incongruence which they can tolerate (from Assumption Two). She can achieve this task by observing how closely the child attends to a learning problem. Lack of attention can mean that the problem is too boring (it too closely matches the expected level of stimulation or it is below this level) or it is too difficult (the level of stimulation is much greater than expectations). In the first situation, the child must be given a more complex problem, and the second instance requires the presentation of component tasks which are related to the difficult problem. Success in maintaining a high level of motivation depends upon the types of didactic materials used by the pupil. If these materials provide immediate feedback and are congruent with his level of mental development (Assumption Three), then mastery of the task is assured. Immediate feedback provides the child with information concerning whether he has successfully accommodated his cognitive processes to the problem. In terms of Hunt's model, a successful accommodation means that incongruity

between expectations and external stimulation is reduced. Therefore, didactic materials which present a new match must be presented after the previous level of incongruity is reduced. Clearly, the new match will occur when the didactic materials are more complex than the previous materials. Hence, materials must be sequenced so that they are congruent with mental development in order to produce the correct match. However, it appears that the didactic materials can not only exercise current mental operations but they can cause the emergence of more complex mental operations. Therefore, didactic materials must be designed that both exercise current mental processes and move the child to higher levels of development. In order to accomplish these goals, it seems that materials should be designed which are both similar to previous materials and contain differences that encourage the growth of mental abilities. The child receives reinforcements from his problem solving activities rather than from external sources (Assumption Four). This situation aids in creating a correct match because the child informs himself concerning the success of his attempt to overcome incongruence between his expectations and external stimulation. Thus, the child develops control over his behaviors through observing their outcomes instead of depending upon external sources of information. It may be possible that these four assumptions can generate a sufficient number of educational ideas for promoting intellectual development, since knowledge

concerning which of the six assumptions are essential for promoting such development is not given from the study of the Montessori method. One solution to this problem is to adopt Bloom's constancy and consistency hypotheses in applying them. The following statement by Bloom implies that changes in all aspects of the educational environment must occur in order to produce increases in intelligence:

> Closely related to the idea of constancy is that of consistency. Constancy implies a similarity over time, whereas consistency suggests that various contemporary aspects of the environment are similar and mutually reinforcing. A characteristic such as physical growth may be understood in terms of constancy of nutritional elements, the availability of a supply of nutriments over time, and the availability of physical and medical care which is preventative of major diseases or which assures prompt remediation to reduce the ravages of such diseases on growth. However, the more complex types of growth (emotional as well as intellectual) may be affected only when there is considerable consistency in the environment as different individuals and ideas interact with the subjects (or learners).
>
> Perhaps the notion of consistency is what distinguishes a powerful learning environment from one that is only moderate or ineffectual in its consequences for the students. Thus the evidence . . . suggests that growth in problem solving is minimal and insignificant if only a single course emphasizes this type of thinking and learning. Whereas, if all portions of the curriculum emphasize and encourage this type of thinking, change is likely to be substantial for almost all the students who complete a year or more of the learning program . . . . (Bloom, 1964, p. 195)

The application of all six of these assumptions to a preschool setting may produce enough constancy and consistency to improve the intellectual and social development of disadvantaged children. However,

two important educational problems must be considered when applying these assumptions. The first problem concerns the abilities that are being improved when they are applied and the second issue is related to "pushing" children to develop. It appears that specific problem solving skills and general cognitive and personality characteristics will be changed. Evidence for this statement is given by Bloom's (1964) analysis of the effects of consistent environmental changes upon early development. It seems likely that an educational system based upon these assumptions will not "push" children to learn because it encourages the development of pleasurable experiences. Hunt's position on this second problem supports the positive effects that will result from using the assumptions:

> Once it is recognized that positive motivation and pleasure inhere in the learning process when there is a proper match between the situation encountered and the child's already assimilated schemata, it becomes unnecessary to worry about pushing children. Moreover, motivational withdrawal from the school situation may derive as much from the boredom that comes from "too much of the same" as from the distress of the child being faced with things beyond his ken or from punishing teachers. (Hunt, 1961, p. 279)

Training in esthetic values (from Assumption Five) can also follow Hunt's motivational model, since artistic learning materials and an esthetically pleasing classroom can be designed to optimize the match. Finally, three, four and five year old children who are grouped together can motivate each other to master learning problems (Assumption Six).

The process by which this occurs is described by Montessori:

> There are many things which no teacher can convey to a child of three, but a child of five can do it with the utmost ease. There is between them a natural mental "osmosis." Again, a child of three will take an interest in what a five year old is doing, since it is not far removed from his own powers . . . . (1969, p. 226).

Support for the effectiveness of these assumptions is given from both empirical studies (Kohlberg, 1968a; Moore, 1963; Moore & Anderson, 1968) and conceptual analysis (Bruner, 1962). In a preliminary report Kohlberg (1968) stated that ten disadvantaged children showed a mean IQ increase of 15 points on the Stanford-Binet test after being in a Montessori kindergarten for four months. He (1968b, p. 1055) attributed these gains to "attentional and verbalization factors rather than to general or cognitive-structural development, since the changes were not reflected in increments in Piaget task performance." O. K. Moore (1963) has reported that his autotelic responsive environment is successful in teaching three and four year olds to read. This outcome may be attributed to the fact that the child engages in independent problem solving activities (Assumption Two), the learning device provides immediate feedback concerning the correctness of problem solving behavior (Assumption Three), and the "talking" typewriters provide intrinsic rewards (Assumption Four). According to Moore, extrinsic rewards produce inefficient learning because they are distracting, i.e., the

subject has to master both the task and its relation to external rewards. In addition, Moore and Anderson (1968) believe that esthetic factors may play an important part in the successful training of children (Assumption Five):

> For reasons which we do not understand very well, our most successful laboratory assistants have a high degree of interest in matters aesthetic. This seems odd in view of the stereotype according to which interest in aesthetics precludes interest in machines; although, of course, a piano is a sound-producing machine. (1968, p. 185)

A child is introduced to the learning laboratory and informed about the rules of conduct by another child. Thus, Assumption Six also might have an important function in the success obtained by this method.

Moore and Anderson contend that their program's success is related to the radical physical and psychological differences between their learning laboratory and the child's usual environment. In this sense, the child is "cut-off" from the "everyday" world by changes in factors such as the rules which must be followed and the physical features of the learning milieu. This technique is closely related to Bloom's consistency hypothesis, and it is likely that the application of the six assumptions to any educational setting also will provide enough consistency to yield results that are comparable to those obtained in the autotelic responsive environment.

ment.

Bruner (1962, pp. 82-83) defines discovery learning as "a matter of rearranging or transforming evidence in such a way that one is enabled to go beyond the evidence as reassembled to new insights." Assumptions Two, Three and Four have an important relationship to this definition since their application enables the child to arrive at solutions to problems by "rearranging" didactic materials. Bruner contends that the process of rearranging evidence increases intellectual potency, causes a shift from extrinsic to intrinsic rewards, produces the learning of the heuristics of discovering, and aids in conserving memory. Bruner's belief that discovery learning and intrinsic rewards are closely linked together supports this writer's viewpoint that Assumptions Two, Three and Four are necessary for generating effective learning situations. It is interesting that Bruner's statement on this relationship is similar to Hunt's notion of the "match" and Moore's autotelic learning environment:

> The hypothesis I would propose here is that the degree that one is able to approach learning as a task of discovering something rather than "learning about" it, to that degree there will be a tendency for the child to work with the autonomy of self-reward or, more properly, be rewarded by discovery itself. (Bruner, 1962, p. 88)

Clearly, the works of Moore and Bruner indicate that these six assumptions have influenced modern educational practices and

theories and they are closely linked to important innovative programs that have resulted in successful outcomes. Therefore, support for the usefulness of these assumptions is provided by empirical studies and conceptual analysis, since the works of Moore and Bruner are closely related to Assumptions Two through Six. Assumption One receives support from Piaget (1952) and Kephart's (1960) theories and research because they have demonstrated how sensory and motor development underliemental operations. Apparently, the use of Hunt's motivational model as a guiding strategem for developing assumptions can lead to a system of ideas that will produce an effective educational method for preschool children. The following sections of this proposal will demonstrate how these assumptions can be applied to educating disadvantaged preschool children.

EXAMINATION OF DEFICIENCIES IN THE DISADVANTAGED CHILD

Robert Havighurst (1969) has described disadvantaged individuals in terms of various social and economic characteristics, and his statements will be utilized to define the population referred to in this dissertation:

> We have also defined rather accurately the "socially disadvantaged" group as consisting roughly of the bottom 15 percent of our population in terms of income and educational achievement. Some people would argue that this is too small a proportion. They would add another 10 percent, to make it a quarter of the population. Others would go so far as to define all manual workers and their families (about 60 percent of the population) as socially disadvantaged, but this kind of proposition could not be supported with data on inadequacy of income, educational achievement, stability of family, law-observance, or any other major index of standard of living. While the stable working class (or upper working class), consisting of 40 percent of the population, is slightly below the white-collar group in average income, educational level, and other socio-economic indices, this group is not disadvantaged in an absolute sense, does not feel disadvantaged, and has an active interchange of membership with the white-collar group between successive generations. (1969, pp. 1-2)
>
> . . . . . .
>
> Thus, when we speak of the group of socially disadvantaged people in America, we are speaking of some 15 to 20 percent of the population who are like each other in their poverty, their lack of education and work skills, but unlike each other in ethnic sub-culture. Crude estimates indicate this group contains about 20 million

> English-Speaking Caucasians, 8 million Negroes, 2 million Spanish-Americans, 700,000 Puerto Ricans, and 500,000 American Indians. (1969, p. 2)

The social and economic descriptions of disadvantaged individuals do not provide information that is directly related to their education, and it appears that the most relevant information about disadvantaged preschool and primary grade children can be derived from an analysis of their cognitive and social deficiencies, since educational programs can be designed with the goal of reducing these deficiencies. The following section examines research on the perceptual and motor deficits of disadvantaged preschool and primary grade children to demonstrate how their deficiencies can be analyzed and applied to constructing educational objectives.

Perceptual and Motor Deficiencies

A comparison of the Metropolitan Readiness Test scores of disadvantaged children with national norms indicated that they were below average in academic readiness (Fisher & Turner, 1969). In addition, research conducted by P. Katz and M. Deutsch (1967) and C. Deutsch (1967) suggests that reading readiness deficiencies in culturally disadvantaged children may be related to poor visual and auditory development. For example, Katz and Deutsch have

shown that disadvantaged first and second grade children who were "poor" readers in comparison to"good" readers had more problems in shifting their attention from visual to auditory modalities or vice versa, had more difficulties in paying attention to a task requiring continual vigilance, and showed more difficulties in differentiating between both auditory and visual stimuli. C. Deutsch also found that poor readers who were in the first grade scored lower on the Wepman Auditory Discrimination Test than did good readers, and they also had more auditory than visual discrimination problems. In regard to this latter result C. Deutsch said:

> it may well be that lower-class children, who live in very noisy environments, do not develop the requisite auditory discrimination abilities to learn to read well - -or adequately- -early in their school careers. In contrast,middle-class children from quieter and more speech-directed environments would not have this problem. It is not meant here to imply that all children from disadvantaged environments are going to be poor in auditory discrimination, while all middle-class children are going to have adequate skill in this area. Rather, the implication is that the conditions under which children live, particularly early in life, are going to affect auditory skill in a predictable way. Within this framework, large individual differences are possible among children who live in close proximity to one another, depending, for example, on the amount of speech and other meaning-

> ful auditory "signals" which are directed toward them. Middle-class children do live in a more speech-directed environment and at the same time in a less noisy and crowded one (i. e., there is both more signal and less noise in the system) and this could have a direct effect on their auditory skills. (1967, p. 275)

Other investigations by Covington (1962) and Baughman (1968) demonstrated that disadvantaged children who were entering kindergarten had difficulties matching and identifying visual stimuli. It appears that the results of the studies of Katz and Deutsch, Covington, and Baughman indicate that poor ability to pay attention and to make visual discriminations accounts for the low performance of culturally disadvantaged children on tests of perceptual-motor development. In addition to these findings, Baughman (1968) reported that disadvantaged children who were entering kindergarten performed more poorly than middle-class subjects on the Spatial Relations subtest of the Primary Mental Abilities test. According to these authors, the subtest evaluates the ability to see relationships among different geometric forms. The results of Bender-Gestalt tests that were administered in a Title III early education project ("Operation Uplift," 1969) are also congruent with Baughman's data, because disadvantaged children of similar ages demonstrated poor organization of these forms when asked to copy them, and further testing in this project showed that entering first grade children

performed below national norms on the Copying subtest of the MRT (Fisher & Turner, 1969). According to Hildreth, et al (1969), this subtest "measures a combination of visual perception and motor control." A final study by Kunz and Moyer (1969) showed that disadvantaged children scored significantly lower on a test of eye-hand coordination than did advantaged children. In summary, the research which has been described demonstrates the following perceptual and motor deficits in culturally disadvantaged children:

1. Difficulties in paying attention to tasks requiring vigilance.
2. Difficulties in shifting attention from auditory to visual modalities or vice versa.
3. Difficulties in discriminating between both auditory and visual stimuli.
4. More discrimination problems with auditory than with visual stimuli.
5. Difficulties in organizing visual stimuli.
6. Deficiencies in eye-hand coordination.

Clearly, all disadvantaged children do not have these deficits, but the research indicates that their incidence is greater in comparison with middle-class children. Consequently, it behooves educators to develop programs which remove these deficiencies because they appear to interfere with learning to read and other skills that require adequate perceptual and motor development.

DERIVATION OF EDUCATIONAL OBJECTIVES

At the 1969 American Psychological Association meeting Havighurst presented his viewpoints concerning how the problem of educating disadvantaged children should be approached:

> For the past ten years our principal attack on the problem of social disadvantage has been through the War on Poverty. We have spent much talent and energy and a good deal of money, without raising the educational or occupational achievement level of this group appreciably, except in a few unusual situations. These unusual situations, in which disadvantaged children and youth have made normal or even superior progress, do not provide us with any broad program ideas that can be applied widely. They seem to tell us that:
>
> a. No mere quantitative changes in the school program are likely to work. It does not bring a widespread improvement to extend the school day an hour, or the school year by a month, or to reduce class size, or to revise school attendance boundaries;
>
> b. Close and minute attention to the process of teaching a particular subject at a particular age may be useful;
>
> c. We should look closely at children and their particular learning behavior for clues to action. (p. 3)

Points b and c are incorporated into this inquiry, since the six assumptions generated from the Montessori method refer to the teaching process, and the examination of developmental and educational deficiencies is associated with the "particular learning

behavior" of disadvantaged children. This section will describe and illustrate how these educational assumptions and information about deficiencies can be combined to construct educational objectives. It must be emphasized that the underlying idea for constructing these objectives is Hunt's motivational model. Accordingly, educational goals will be constructed which attempt to create a proper "match" between cognitive expectancies and environmental stimulation. A fundamental question which arises concerns whether the application of this model will promote learning in disadvantaged children. The evidence presented by Montessori (1964) and Kohlberg (1968a) seems to support its use with the disadvantaged because their work shows that reduction in cognitive incongruity between expectancies and external stimuli is a powerful reinforcement. It is clear that tangible rewards can also produce learning in disadvantaged children (Zigler & de Labry, 1962; Lighthall & Cernius, 1967), but the epistemic philosophy which underlies the use of these rewards does not appear to be as suitable for educational purposes as the one associated with cognitive reinforcements. Hence, an educational system based upon the use of tangible rewards assumes that the acquisition of knowledge will occur only as a result of the reduction in biological drives. On the other hand, cognitive reinforcement theory assumes that learning occurs as a result of increased knowledge, i.e., the learning process

per se is intrinsically reinforcing and motivating. Educational programs which incorporate curricula that encourage intrinsic motivation may be most effective for disadvantaged children because they will direct activities solely to the learning task. Children who become motivated by cognitive drives also might develop greater interests in "learning for learning's sake" than those pupils who are motivated by primary or secondary rewards. Ausubel believes that intrinsic motivation must be developed in disadvantaged children to produce optimal learning:

> The development of cognitive drive, or of intrinsic motivation for learning (for the acquisition of knowledge as an end in itself or for its own sake), is the most promising motivational strategy which can be adopted in relation to the culturally deprived child. It is true, of course, in view of the anti-intellectualism and pragmatic attitude toward education that is characteristic of lower-class ideology, that a superficially better case can be made for the alternative strategy of appealing to the job-acquisition, -retention, and -advancement incentives that now apply so saliently to continuing education because of the rapid rate of technological change. Actually, however, intrinsic motivation for learning is more potent, relevant, durable, and easier to arouse than its extrinsic counterpart. (1968, p. 446)

It appears that intrinsic motivation can be developed most effectively, if educational objectives are based upon the six assumptions described in section two of this paper. Kohlberg, in essence, argues for these assumptions when he says that individual activities will more readily develop attention than will a "conventional permissive peer-oriented pre-school classroom" (1968a, 1. 109), and Radin and Weikart (1966)

report that high IQ gainers had less interference in their home learning activities by other children than did low IQ gainers.

Assumption One states that the child's sensory and motor abilities must be educated to prepare him for independent problem solving activities. The perceptual and motor defects discussed in the previous section emphasize the necessity for meeting this assumption. Assumptions Two, Three and Four require that the child engage in independent learning activities with didactic materials that give immediate feedback and promote intrinsic motivation. Assumptions Five and Six demand that the perceptual and motor activities have artistic value and children of different ages should learn the materials together.

Educational Objectives

1. Disadvantaged children should engage in independent perceptual learning activities.
2. Didactic materials should be utilized which are immediately reinforcing and intrinsically motivating.
3. Tasks should be used which educate the child's ability to: (a) pay attention to auditory and visual stimuli, (b) shift attention between auditory and visual modalities; and (c) discriminate between both auditory and visual stimuli.

4. Learning problems should be used which give training in organizing visual stimuli.
5. Some of the materials for training discrimination and organization should be artistic works such as reproductions of paintings.
6. Eye-hand coordination should be developed through the presentation of appropriate learning tasks.
7. Children of different age levels should be placed together for these perceptual learning activities and they should be allowed to interact with each other.

A number of approaches can be utilized to fulfill these objectives. For example, the following types of materials can be used to develop auditory and visual abilities: Didactic stimuli from the Montessori method (1964), puzzles made by Developmental Learning Materials (1968), Directional-Spatial-Pattern Board Exercises (Teaching Resources, 1968b), and Eye-Hand Coordination Exercises (Teaching Resources, 1968a). The primary criteria for the selection of materials should be that they promote independent learning, provide immediate feedback and are autotelic in nature, and develop areas of deficiency.

Silver, et al (1968) have described a perceptual training program that was given to children with learning disorders, and this approach can be utilized with disadvantaged preschool children. An

outline of the exercises follows in order to illustrate the detailed nature of the training sequence:

I. Visual Modality

A. Forms

1. Simple

2. Asymmetric

3. Matrix-like

4. Complex

5. Letters

6. Review Games:

Form Dominoes

Concentration

B. Spatial Orientation

1. Orientation Lockplate

2. Square Puzzles

3. Pythagoras Puzzle

C. Visual Figure-Background

1. Patterns

2. Single Letters

3. Letter Sequences

II. Auditory Modality

A. Code Patterns

B. Sequencing

1. Alphabet

2. Telephone Game

3. Xylophone Game

4. Pictures

5. Song Chains

C. Sound Discrimination

1. Initial Sounds

2. Final Sounds

D. Word Discrimination

E. Rhyming

1. Discrimination Rhymes

2. Picture Strips

3. Supplying Rhymes

4. Review Game:

Rhyming Dominoes

CONCLUSION

The theory underlying the derivation of educational objectives is as follows: Educational programs for the disadvantaged child should be based upon a motivational model that promotes optimal cognitive and social development. Educational assumptions based upon this model should be derived to describe the general principles for motivating children to learn materials and develop their cognitive abilities. The deficiencies of disadvantaged children are examined to ascertain their educational needs, and educational objectives should be developed which result from combining the motivational assumptions with methods for correcting these deficiencies. It appears that this theory can produce an effective evaluation technique because it requires the evaluator to ask three important educational questions:

1. Is the program derived from examining the child's cognitive and social deficits?
2. Is the program motivating the child to learn progressively more complex materials?
3. Is the child's cognitive and social development being promoted?

The refinement of the motivational assumptions and the further analysis

of cognitive and social deficiencies will provide a source for generating more precise educational objectives. It is believed that such objectives will provide an effective technique for evaluating programs for disadvantaged preschool children.

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